

WHAT IS CLAIMED IS:

Ansatz

1. A method of cloning a cow, comprising:
 - (i) inserting a desired differentiated cow cell or cell nucleus into an enucleated cow oocyte, under conditions suitable for the formation of a nuclear transfer (NT) unit to yield a fused NT unit;
 - (ii) activating said fused nuclear transfer unit to yield an activated NT unit; and
 - (iii) transferring said activated NT unit to a host mammal such that the activated NT unit develops into a fetus.
2. The method of Claim 1 wherein said differentiated cow cell is non-serum starved.
3. The method of Claim 1 wherein said differentiated cow cell is serum starved.
4. The method according to Claim 1, which further comprises developing the fetus to an offspring.
5. The method according to Claim 1, wherein a desired DNA is inserted, removed or modified in said differentiated cow cell or cell nucleus which may or may not be serum starved prior to insertion into said enucleated

cow oocyte, thereby resulting in the production of a genetically altered fused NT unit.

6. The method according to Claim 5, which further comprises developing the fetus to an offspring.

7. The method according to Claim 1, which comprises culturing said activated NT unit until greater than the 2-cell developmental stage prior to transferring to said host mammal.

8. The method according to Claim 1, wherein the differentiated cow cell or cell nucleus is derived from mesoderm.

9. The method according to Claim 1, wherein the differentiated cow cell or cell nucleus is derived from ectoderm.

10. The method according to Claim 1, wherein the differentiated cow cell or cell nucleus is derived from endoderm.

11. The method according to Claim 1, wherein the differentiated cow cell or cell nucleus which may or may not be serum starved is a fibroblast cell or cell nucleus.

12. The method according to Claim 1, wherein the differentiated cow cell or cell nucleus is an adult cell or cell nucleus.

13. The method according to Claim 1, wherein the differentiated cow cell or cell nucleus is an embryonic or fetal cell or cell nucleus.

14. The method according to Claim 1, wherein the enucleated cow oocyte is matured prior to enucleation.

15. The method according to Claim 1, wherein the fused nuclear transfer unit is activated by exposure to at least one activating factor derived from sperm cells.

16. The method according to Claim 1, wherein the fused nuclear transfer unit is activated by exposure to a composition comprising calcium ionophore and 6-dimethyl-aminopurine.

17. The method according to Claim 5, wherein said desired DNA is heterologous DNA.

18. The method according to Claim 17, wherein micro-injection is used to insert said heterologous DNA.

19. The method according to Claim 17, wherein electroporation is used to insert said heterologous DNA.

20. A fetus obtained according to the method of Claim 1.

21. An offspring obtained according to the method of Claim 4.

22. Progeny of the offspring according to Claim 21.

23. A transgenic fetus obtained according to the method of Claim 5.

24. A transgenic offspring obtained according to the method of Claim 6.

25. Progeny of the offspring according to Claim 24.

26. The method ~~according~~ to Claim 1, which further comprises combining the activated NT unit with a fertilized embryo to produce a chimeric embryo prior to transfer to the host mammal.

27. The method according to Claim 26, which further comprises developing the fetus to an offspring.

28. A fetus obtained according to the method of Claim 26.

29. An offspring obtained according to the method of Claim 27.

30. Progeny of the mammal according to Claim 29.

31. A method of producing a cow CICM cell line, comprising:

(i) inserting a desired differentiated cow cell or cell nucleus into an enucleated cow oocyte, under conditions suitable for the formation of a nuclear transfer (NT) unit to yield a fused NT unit;

(ii) activating the fused nuclear transfer unit to yield an activated NT unit; and

(iii) culturing cells obtained from said activated NT unit to obtain a cow CICM cell line.

32. The method of Claim 31, wherein said differentiated cell is serum starved.

33. The method of Claim 31, wherein said differentiated cell is non-serum starved.

34. The method of Claim 31, which comprises culturing said activated nuclear transfer unit until greater than the 2-cell developmental stage prior to culturing said cow CICM cell line.

35. A CICM cell line obtained according to the method of Claim 31.

36. The method according to Claim 31, wherein a desired DNA is inserted, removed or modified in said differentiated cow cell or cell nucleus prior to insertion into said enucleated cow oocyte, thereby resulting in the production of a genetically altered fused NT unit.

37. A transgenic cow CICM cell line obtained according to Claim 36.

38. The method of Claim 31, which further comprises inducing the cow CICM cell line to differentiate.

39. Differentiated cells obtained by the method of Claim 38.

40. A method of ~~therapy~~ which comprises administering to a human patient in need of cell transplantation therapy xenogenic differentiated cells according to Claim 39.

41. The method of Claim 40, wherein said cell transplantation therapy is effected to treat a disease or condition selected from the group consisting of Parkinson's disease, Huntington's disease, Alzheimer's disease, ALS, spinal cord defects or injuries, multiple sclerosis, muscular dystrophy, cystic fibrosis, liver disease, diabetes, heart disease, cartilage defects or injuries, burns, foot ulcers, vascular disease, urinary tract disease, AIDS and cancer.

42. A method of therapy which comprises administering to a human patient in need of cell transplantation therapy xenogenic cells obtained from a fetus according to Claim 20.

43. The method of Claim 42, wherein said cell transplantation therapy is effected to treat a disease or condition selected from the group consisting of Parkinson's disease, Huntington's disease, Alzheimer's disease, ALS, spinal cord defects or injuries, multiple sclerosis, muscular dystrophy, cystic fibrosis, liver disease, diabetes, heart disease, cartilage defects or injuries, burns, foot ulcers, vascular disease, urinary tract disease, AIDS and cancer.

44. A method of therapy which comprises administering to a human patient in need of cell transplantation therapy xenogenic cells obtained from an offspring according to Claim 21.

45. The method of Claim 44, wherein said cell transplantation therapy is effected to treat a disease or condition selected from the group consisting of Parkinson's disease, Huntington's disease, Alzheimer's disease, ALS, spinal cord defects or injuries, multiple sclerosis, muscular dystrophy, cystic fibrosis, liver disease, diabetes, heart disease, cartilage defects or injuries, burns, foot ulcers, vascular disease, urinary tract disease, AIDS and cancer.

46. A method of therapy which comprises administering to a human patient in need of cell transplantation therapy xenogenic transgenic cells obtained from a transgenic fetus according to Claim 23.

47. The method of Claim 46, wherein said cell transplantation therapy is effected to treat a disease or condition selected from the group consisting of Parkinson's disease, Huntington's disease, Alzheimer's disease, ALS, spinal cord defects or injuries, multiple sclerosis, muscular dystrophy, cystic fibrosis, liver disease, diabetes,

heart disease, cartilage defects or injuries, burns, foot ulcers, vascular disease, urinary tract disease, AIDS and cancer.

48. A method of therapy which comprises administering to a human patient in need of cell transplantation therapy xenogenic transgenic cells obtained from a transgenic offspring according to Claim 24.

49. The method of Claim 48, wherein said cell transplantation therapy is effected to treat a disease or condition selected from the group consisting of Parkinson's disease, Huntington's disease, Alzheimer's disease, ALS, spinal cord defects or injuries, multiple sclerosis, muscular dystrophy, cystic fibrosis, liver disease, diabetes, heart disease, cartilage defects or injuries, burns, foot ulcers, vascular disease, urinary tract disease, AIDS and cancer.

50. A method of producing a pharmaceutically active protein, comprising isolating a pharmaceutically active protein which is expressed by a transgenic offspring according to Claim 24.

51. The method according to Claim 31, which further comprises combining the activated NT unit with a fertilized

embryo prior to culturing cells to produce a chimeric CICM cell line.

52. The method according to Claim 51, which further comprises developing the chimeric CICM cell line to a chimeric embryo.

53. A chimeric embryo obtained according to Claim 52.

54. The method according to Claim 52, which further comprises developing the chimeric embryo to a chimeric fetus.

55. A chimeric fetus obtained according to Claim 54.

56. The method according to Claim 54, which further comprises developing the chimeric fetus to a chimeric offspring.

57. A chimeric offspring obtained according to Claim 56.

58. The method according to Claim 51, wherein a desired DNA is inserted, removed or modified in said differentiated cow cell or cell nucleus prior to insertion

into said enucleated cow oocyte, thereby resulting in the production of a genetically altered fused NT unit.

59. The method according to Claim 58, which further comprises developing the chimeric CICM cell line to a chimeric embryo.

60. A chimeric embryo obtained according to Claim 59.

61. The method according to Claim 59, which further comprises developing the chimeric embryo to a chimeric fetus.

62. A chimeric fetus obtained according to Claim 61.

63. The method according to Claim 61, which further comprises developing the chimeric fetus to a chimeric offspring.

64. A chimeric offspring obtained according to Claim 63.

65. A method of cloning a cow, comprising:

(i) inserting a desired differentiated cow CICM cell or cell nucleus into an enucleated cow oocyte, under

conditions suitable for the formation of a nuclear transfer (NT) unit to yield a fused NT unit;

(ii) activating said fused nuclear transfer unit to yield an activated NT unit; and

(iii) transferring said activated NT activated unit to a host mammal such that the NT unit develops into a fetus.

66. The method of Claim 65, wherein said differentiated cell is starved.

67. The method according to Claim 65, wherein said differentiated cell is non-serum starved.

68. The method according to Claim 65, which comprises culturing said activated NT unit until greater than the 2-cell developmental state prior to transferring to said host mammal.

69. The method according to Claim 65, which further comprises developing the fetus to an offspring.

70. A fetus obtained according to the method of Claim 65.

71. An offspring obtained according to the method of Claim 69.

72. An organ for use as an organ xenograft, which is obtained from the offspring according to Claim 21.

73. An organ for use as an organ xenograft, which is obtained from the offspring according to Claim 24.

74. An organ for use as an organ xenograft, which is obtained from the offspring according to Claim 29.

75. An organ for use as an organ xenograft, which is obtained from the offspring according to Claim 64.

76. An organ for use as an organ xenograft, which is obtained from the offspring according to Claim 71.

77. An offspring according to Claim 21, which comprises an agriculturally useful trait.

78. An offspring according to Claim 24, which comprises an agriculturally useful trait.

79. An offspring according to Claim 29, which comprises an agriculturally useful trait.

80. An offspring according to Claim 64, which comprises an agriculturally useful trait.

81. An offspring according to Claim 71, which comprises an agriculturally useful trait.

82. A transgenic cow.

83. An organ for use as an organ xenograft, which is obtained from a transgenic cow.

84. The method according to Claim 50, wherein the pharmaceutically active protein is isolated from milk of the transgenic offspring

85. The method according to Claim 50, wherein collagen, fetal calf serum or another biologically active protein is isolated from said transgenic offspring or fetus.